ILLUSTRATED CATALOGUE

—OF—

Spraying Material

—AND—

Hop Supplies

With Directions How to Prepare and Apply the Various Insecticides.

ISSUED BY

THE PUYALLUP HARDWARE COMPANY,

The Hop Growers' Supply House.

PUYALLUP, - - - WASHINGTON.

1895.

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THIS PAMPHLET is issued, not as a price list, but as a spraying guide. We give the more important diseases and their remedies, and trust that the fruit and hop growers of the Northwest will be hereby enabled more successfully to combat the ravages of the orchard and the hop yard. We pride ourselves on being headquarters in the state for all kinds of the best sprayers and spraying material. We are always glad to answer any enquiries in this line.

As the market price of Cotton Twine, Hop Cloth, etc., varies during the season and generally rises as the season advances, we would recommend hop growers to place their orders early for these articles and thus take advantage of the lowest figure. We will be pleased to quote prices on cotton twine for stringing yards at any time now, and will send samples of same on application.

TERMS.—Our terms are cash with order, or draft with bill of lading.

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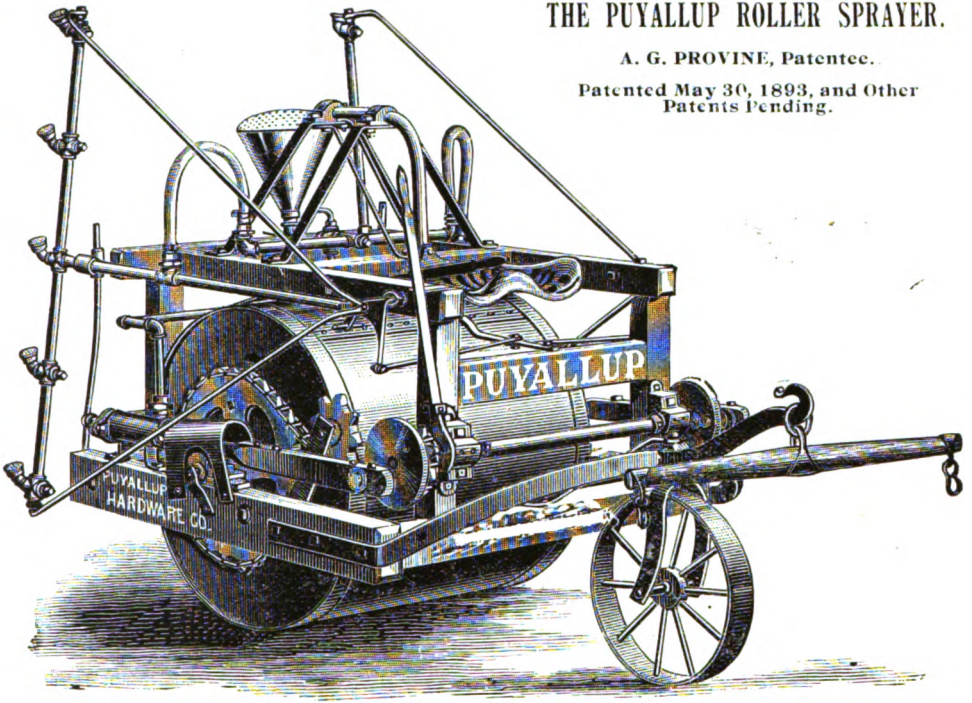
THE PUYALLUP ROLLER SPRAYER.

A. G. PROVINE, Patentee.

Patented May 30, 1893, and Other Patents Pending.



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WHEN AND WHAT TO SPRAY,

HOW TO DO IT, AND WHAT TO DO IT WITH.

THE PUYALLUP ROLLER SPRAYER.

PRACTICAL EXPERIENCE is at all times the final test to which every invention, be it ever so perfect, has to submit, especially so is it true of mechanical inventions, and in nothing has it been more clearly demonstrated than in the matter of Horse Power Spraying Machines.

During the 1892 season five different machines were on the market, all of which were new and untried, with the exception of the English Sprayer. While all possessed some points of merit it was apparent that great improvements could be made. As the manufacturers of the Roller Sprayer, we were satisfied we had the true principle, (a roller tank) and accordingly made a number of Sprayers which were readily sold. On those we first made the pumps were driven by a rock-shaft which, while giving sufficient force when the vines were not full-grown, failed to give entire satisfaction in yards where the hop poles were 18 feet and over. We then constructed a chain-driving ('92) machine which gave the desired power and proved so successful that we were unable to supply the demand. During the spraying season we made careful observations of the operation of the different machines and were thus

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able to embody all needed improvements in our 1893 pattern, some of which are as follows:

Weight and driving power placed low so as to give a much more steady running machine.

Pumps of almost double capacity of former machines, with light and heavy spraying adjustment.

A larger air-chamber, giving even pressure and reserve force, whereby the end hills of hop rows can be sprayed equally as well as inside ones.

A seat in front of machine for driver, where he is out of the spray and can readily handle machine and horse.

Automatic adjustment of spray pipes by which they are always kept on the vertical plane, whether the machine is on rough or sloping or level land.

Condensing of spray nozzles, thereby combining the entire force, causing it to reach every part of the foliage.

The nozzle used is Hood's Improved Cluster Spray, which we consider without equal as to effective spraying, economy and durability. It produces a fine spray of from one to five small jets, as desired, from each nozzle.

There are no springs or complications to get out of order or catch on the vines.

Every machine is provided with ten of these nozzles which is equal to fifty of those used in 1892.

The nozzle can be placed at any desired height on the spray pipes, or a greater or less number used.

Brakes will be furnished with machines without extra charge.

Our 1893 machine, with the above improvements, having been thoroughly tested in Washington, Oregon, and British Columbia during the season of '94, is now offered to hop and fruit growers as the most perfect power sprayer on the market. With its use the hop grower need not now fear the deadly ravages of insects.

The very satisfactory manner in which hop growers have testified to the value of the Roller Sprayer as the only practical machine, enables us to again place it before them, feeling confident that by its timely use every pound of hops raised may be harvested in good condition.

We have received testimonials from farmers in Washington, Oregon, British Columbia and New York which show what intelligent growers are capable of doing with it. A few of these will be found at the end of this catalogue.

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Our Double-Acting Spray Pump.

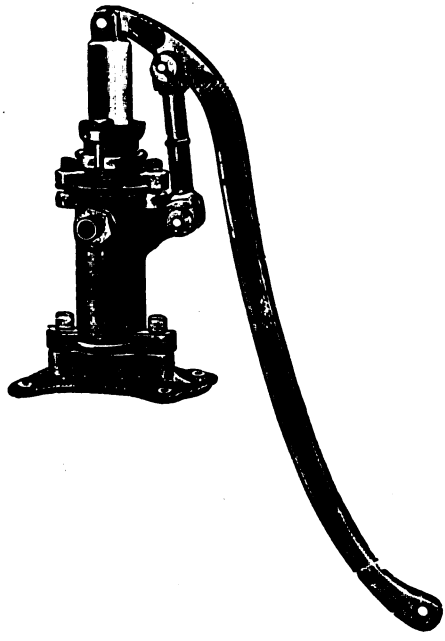

Fig. No. 1.

The above cut represents our Double-Acting Spray Pump which is used in all our Spraying outfits. These pumps are very powerful, and being double-acting, throw a continuous stream. After several years experience we find them to be the best Spray Pump on the market. We fit them up in various styles, ranging in price up to $20.00, as shown in the next illustration.

Suction, 1 inch. Two 3-4 inch Discharges.

PRICE,..... $.. ..

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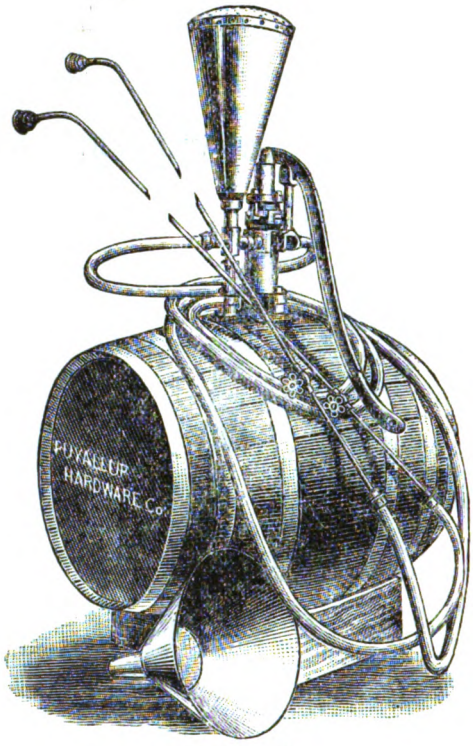

Fig. No. 2.

Our Improved Hand Sprayer.

Our Improved Hand Sprayer consists of

One Double-Acting Force Pump,
One Large Air-Chamber,
Two Twelve and One-Half Feet Lengths of Hose,
Two 7-Feet Rods, (¼ inch pipe),
Two Hood's Patent Cluster Sprays,
Two Cut-off Valves,
One Suction Pipe with Strainer.
One Funnel with Strainer.

PRICE..... **$20 00**

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Our Improved Hand Sprayer.

We use, this year, a special hose made for very high pressure. It is very much superior to anything hitherto used on Spray Pumps. Samples of hose will be mailed free on application.

This outfit is the result of three years experimenting with the various pumps and appliances for spraying. We have had the experience of the largest fruit and hop growers to guide us and we can confidently recommend this outfit as the best obtainable for the money. The pump is double-acting, has large air-chamber to cushion the spray. It is provided with two discharge ports, one or both of which can be used for spraying. The base is properly shaped to fasten on either end or side of barrel. It has brass cased plunger, good leverage and altogether is an exceedingly powerful pump. At the same time it is easy to operate, and, while a solid stream can be sent a distance of sixty feet, a spray can be sent over the highest hop pole, or over any ordinary fruit tree.

With the attachments as shown in Fig. 1, there is no better outfit for extermination of all kinds of insects that are injurious either to fruit, trees, hop vines, or foliage. The Nozzle used is Hood's Patent Cluster Spray. It is the perfection of Spray Nozzles. There is nothing about it to get out of order; nothing to catch on the vines. Having five outlets it does five times the work of any other nozzle. By referring to Fig. 8, a good idea of the compactness and simplicity of it may be had. Two rows of trees or four rows of hop vines can be sprayed at the same time.

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Handy Knapsack Spray Pump.

FOR ORCHARD, VINEYARD OR FIELD SERVICE.

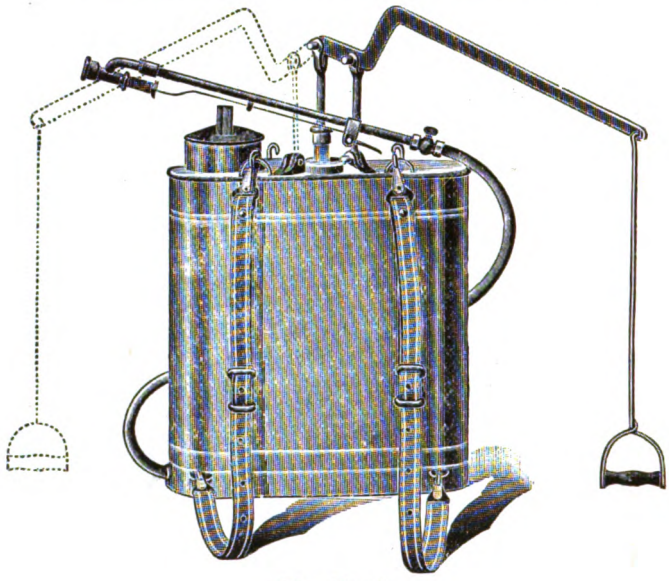

Fig. No. 3.

This represents a new and improved Knapsack Spray Pump which we are confident will give excellent satisfaction. The pump is made entirely of brass and copper, with rubber ball valves and metal plunger. The reservoir is made of heavy copper, and will hold five gallons. The cut shows Vermorel nozzle, but we supply Hood's Patent Spray Nozzle without increasing the price.

PRICE, ... $.....

WE CARRY INCUBATORS, BROODERS, EGG FOOD.

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Standard Double-Acting Spray Pump.

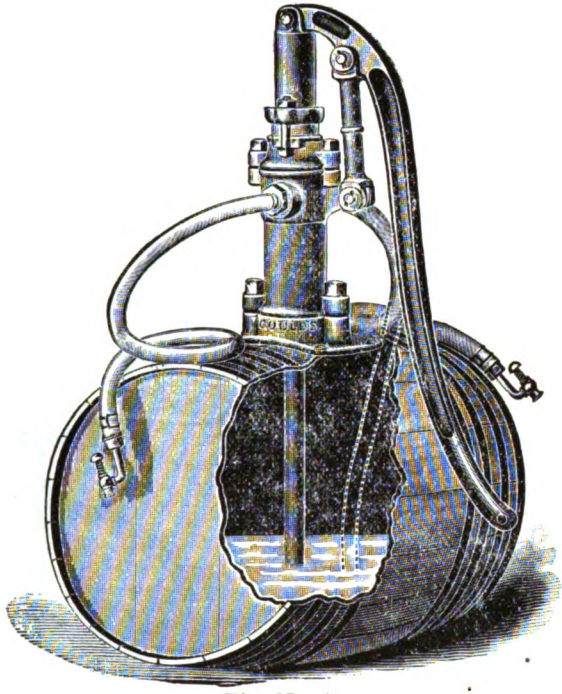

Fig. No. 4.

This represents a cheap outfit consisting of Double-Acting Spray pump, 12½ feet of High-Pressure Hose, one 7-Feet Rod and Stop-Cock and one Hood's Cluster Spray Nozzle.

PRICE, ... $.....

WE CUT QUASSIA FROM THE LOG IN PUYALLUP.

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Portable Brass Spray Pumps.

Fig. No. 6.

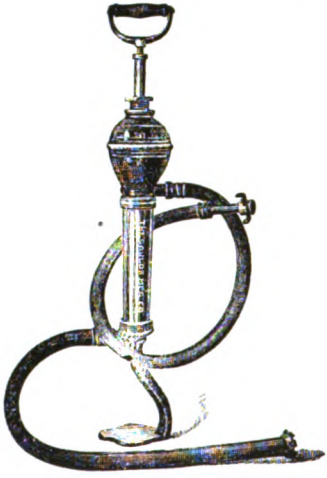

Fig. No. 5.

Fig. No. 7.

These pumps are designed for setting in buckets or similar vessels, and are exceedingly handy for spraying small trees, shrubbery, vines, or watering flowers and vegetables.

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Hood's Patent Cluster Spray Nozzle.

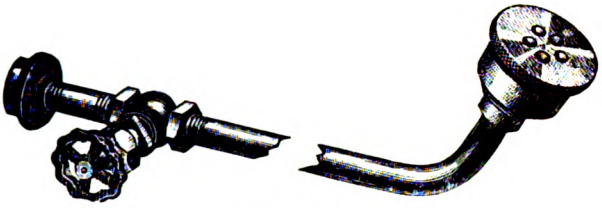

Fig. No. 8.

The above cut represents Hood's Patent Spray Nozzle and manner of attaching rod.

SECTIONAL VIEW OF NOZZLE.

Fig. No. 9.

Price of Cluster Spray Nozzle, for Hand Pump.....$1 50
Price of Cluster Spray Nozzle, for Roller Sprayer..... 1 50

The Nozzles are made with one, three and five outlets.

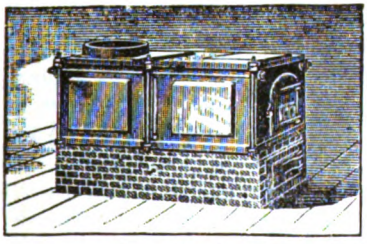

Fig. No. 10.

Hop Stoves.

These are made specially for our trade. They are of good material, having all the bolts on the outside.

NO.	SIZE.	WEIGHT.
1	6½ feet	1150 lbs
2	4½ feet	850 lbs

Stoves are made with 16-inch pipe collar unless otherwise ordered. ☞ Note the weight of the Stoves.

FERTILIZERS FOR HOPS, POTATOES AND FRUIT.

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Fig. No. 11.
Prices on application.

Iron Kettles.

As a great many people make their own soap, and also require large vessels for boiling spraying material, we have a line of these as follows:

20 gallons.....Price, $.....
25 " ..... " $.....
30 " ..... " $.....

Egg Food.

(Trade Mark.)

Fig. No. 12.

Chicken raising is coming very much to the front. There is money in the business. Why not get in and make some? We have all the materials. Incubators, Brooders, Egg Food, Granulated Bone, Roup Pills, etc., etc.

Sturtevant's Imperial Egg Food is the best egg producer on the market. It strengthens weak and drooping fowls and prompts health, growth and fine condition. We keep it!

Quassia Chips.

We have imported Quassia Logs from South America and grind them here in Puyallup. This ensures the quality of the chips, as large quantities are shipped to the Coast after some of the strength has been extracted. Consequently they are not so effective in killing Hop Lice. We dry them thoroughly and put them up in 50 and 100-pound sacks.

Whale Oil Soap.

We carry a large stock of Soap of the best grade, known as 80 per cent. It is put up in 50 and 100-pound boxes, also in barrels of about 350 pounds.

OUR TERMS ARE CASH. PLEASE NOTE THIS.

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Thermometers.

Last season we introduced a special Hop Thermometer. It shows at a glance, if your heat is right. It is RELIABLE, a point which is absolutely necessary in Hop Thermometers. They gave excellent satisfaction last year and we anticipate an increased demand for them this season. The price is $1.00; or post free, securely packed, on receipt of $1.10.

Hop Cloth.

The experience of last year has convinced many growers of the necessity of buying their Baling Cloth early in the season. During hoppicking the price of cloth advanced about three cents in so many weeks. We had great difficulty in supplying the orders which came in late in the season. We have ordered a moderate supply and would strongly advise growers to place their orders early, as thereby only can we guarantee our being able to fill same. Those ordering early secure a much better price, as cloth invariably advances as the season goes on.

Sulphur.

Sulphur was very much in demand last season just at the close of hoppicking and there was almost a shortage. We will be pleased to receive orders for Sulphur in any quantity.

☞Write for prices on Hop Cloth and Sulphur about May 1.

How To Make Soap.

The following recipe is quoted from E. Meeker & Co.'s Hop Annual:

"Take an ordinary iron kettle and first measure out sixteen gallons of water and put in eight pounds caustic soda (76½ per cent.) strength, and bring the water to a boiling point and stir until the soda is dissolved: then heat five gallons whale oil in another vessel, nearly to the boiling point, and thoroughly mix the two together and soap will appear at once.

HOW TO USE IT.

"Then I took forty-five gallons of water in which three pounds of quassia had been soaked while cold (not boiled) and four pounds

WE CARRY A FULL LINE OF PAINTS AND OILS.

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of soap, to make the emulsion, but I intend this year to make it a little stronger with quassia. I soaked the quassia out several times, but aimed to have as much as three pounds of fresh quassia to every forty-five gallons of water and used fresh water each time.

THE COST.

"The cost of this soap need not be to exceed one and three-tenths cents per pound, as it will readily be seen that it is fully 70 per cent. water. Why it is that others who purchased something similar failed to get the same results, it is impossible to say, unless it is when the lice get old they are harder to kill; but it is certain that many did fail, and attributed their failure to the poor quality of soap. It is equally certain that those who will trust a lower strength soap had better make it themselves at nominal cost.

Formula For Making Hop Spraying Emulsion.

Quassia chips and whale oil soap, as follows: Seven to nine pounds quassia chips to six to eight pounds whale oil soap, one-hundred gallons water; steep the quassia chips in thirty gallons of cold water about five hours, then add the soap.

Directions For Preparing Insecticides.

PARIS GREEN.

This poison is used either in solution or in dry form. In solution one pound is mixed with from 100 to 300 gallons of water, the strength depending on the plant sprayed and the insect to be destroyed or warded off. The poison should be mixed with enough water to form a paste, after which the full quantity may be added. It is always best to add one to two pounds of lime for each pound of the green, as the danger to foliage will be much lessened thereby.

Paris Green alone is sometimes applied in dry form. It is best however, to mix each pound with ten pounds of flour or plaster. Although the liquid is much less objectionable, and we would in all cases recommend it.

WRITE US CONCERNING ANYTHING IN OUR LINE.

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LONDON PURPLE.

What is said under Paris Green is applicable here, as both poisons are used in the same manner.

BORDEAUX MIXTURE.

Dissolve eight pounds of copper sulphate or blue vitrol, in ten gallons of water. In a tub or some similar vessel slack three pounds of good fresh lime. When the lime is slacked add sufficient water to make a thick whitewash. Then pour the solution of copper sulphate into a barrel holding forty-five gallons—more or less—and slowly add the whitewash, straining through a gunny-sack, to remove small sticks, twigs, bits of unslacked lime, etc. Stir thoroughly and the mixture is ready for use.

Insects Affecting The Apple.

THE CODDLING MOTH, a little white caterpillar, is the larvæ of a small nocturnal gray moth. The moth deposits her eggs on the blossom end of the fruit. As soon as the eggs hatch, the larvæ eats its way into the young fruit.

REMEDIES.—Spray the trees with Paris Green or London Purple at the rate of one pound to 250 gallons of water; first when the flowers are falling and again when the fruit is the size of peas. By adding Paris Green or London Purple to the Bordeaux mixture at the rate of one pound to 150 gallons of water, both the coddling moth and scab may be treated at the same time. In case it is only desired to spray for insect, a little lime should invariably be added to the Paris Green solution.

THE CANKER WORM eats the green portion of the leaf, giving the tree a brownish color as though scorched by fire. It appears in early spring, and when full-grown is an inch long.

REMEDIES—Spray the trees when the leaves are one-third grown with Paris Green solution, one pound to 200 gallons of water. Usually one spraying will be sufficient; but if the worms appear to be on the increase, a second application will be advisable.

MAKE YOUR HENS LAY—FEED THEM EGG FOOD.

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APPLE TREE TENT-CATERPILLAR.—The large, silken nests made by this insect are familiar to everyone. The caterpillars appear in May or June and in five or six weeks have reached their full size.

REMEDIES.—Cut out and burn the nests as soon as they are seen, taking the precaution to do this in the morning when the caterpillers are all in. This, together with one or two sprayings of Paris Green solution having a strength of one pound to 200 gallons of water, will effectually rid the trees of the pest.

THE APPLE APHIS.—Apple trees are often attacked early in the season by this insect. The aphides or lice are quite small and green in color. By sucking the juices from the young growth they greatly interfere with its functions, and, as a result, the tree has a sickly yellow appearance.

REMEDIES.—Spray with kerosene emulsion at the rate of one gallon to twenty of water as soon as the lice appear, Repeat the treatment in eight or ten nays if necessary, A decoction made by soaking over night four or five pounds of tobacco stems or refuse tobacco of any kind in five gallons of water will also be found an excellent remedy against the lice.

THE OYSTER-SHELL BARK LOUSE. — There are frequently seen on the trunks, branches and twigs of the apple tree, small, whitish shells resembling in shape those of an oyster. Under these shells are numerous small lice, busily engaged in sucking the sap from the tree. In some sections the insect is exceedingly troublesome, often attacking many trees in an orchard.

REMEDIES.—Scrape the trees thoroughly in the spring before the leaves appear, and then paint the trunk and larger limbs with a thick emulsion made by dissolving one quart of soap in half a gallon of hot water. Two ounces of crude carbolic acid added to this will increase its efficiency. Make no further treatment until the middle of May, when kerosene emulsion, one gallon to twenty-five gallons of water should be applied. It is always best to apply the emulsion soon after the lice hatch, the time being determined by closely examining the scales.

Insects Affecting The Pear.

THE PEAR TREE SLUG attacks the leaves, eating away

WIRE, TWINE, ROPE, HOP CLOTH, NEEDLES, &C.

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the green portion, so that nothing remains but the parchment-like tissue and the veins. It appears usually the latter part of June and again in August.

REMEDIES.—Spraying with a simple solution of milk of lime, made by mixing two pounds of lime in twenty gallons of water will often rid the plant of this pest. The first application should be made as soon as the slugs are noticed. If necessary, others should follow in a week or ten days. By adding a little Paris Green, say one ounce, to the lime milk, the latter will be made more effectual.

THE SCURFY BARK LOUSE resembles the Oyster-Shell Bark Louse already described as attacking the apple.

REMEDIES.—The method of dealing with the Oyster-Shell Bark Louse should be followed in this case.

Insects Affecting The Plum.

THE CURCULIO originate from eggs deposited by a small dirty-gray beetle when the flowers are still small.

REMEDIES.—None have thus far proven wholly satisfactory. All things considered, the most reliable known way of dealing with the curculio is to spray with Paris Green. The first application should be made when the flowers are falling, using a solution made by mixing one pound of Paris Green in 200 gallons of water. It a week or ten days make a second application, and follow this by another after the lapse of some length of time.

THE PLUM TREE APHIS resembles the one affecting the peach, and like it may be destroyed by spraying with kerosene emulsion made by mixing one gallon of the concentrated emulsion in twenty gallons of water.

Insects Affecting The Cherry.

THE CHERRY is injured by plant lice resembling those occuring on peach or plum. The pear tree slug also attacks the leaves, while the fruit is infested by the plum curculio.

REMEDIES.—The remedies given under peach and pear insects should be adopted in this case.

PLOWS, CULTIVATORS, RAKES, FORKS, HARROWS.

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Insects Affecting The Currant.

THE IMPORTED CURRANT WORM in its perfect form is a small fly which lays its eggs on the leaves in the early spring. As soon as the eggs hatch, the worms eat circular holes in the foliage. As the worms increase in size they become more voracious, often ridding the trees of its leaves.

REMEDIES.—As soon as the worms are seen, spray the plants with a solution made by mixing one ounce of hellebore in two gallons of water.

THE CURRANT APHIS attacks the leaves, causing them to curl and turn brown. The lice are usually abundant in early summer, but as hot weather advances they disappear.

REMEDIES.—Spray with kerosene emulsion, one gallon to twenty gallons of water, as soon as the lice are noticed.

Fungus Diseases of The Apple.

SCAB.—This disease causes a loss in the United States of over $6,000,000 annually. In 1890 almost the entire apple crop of New York state was destroyed by the scab fungus killing the flowers and young fruit as soon as they appeared.

REMEDIES.—To protect the flowers it is necessary to begin the treatments early. Spray first with ammoniacal solution about the time the flowers are opening. Make a second application of the same fungicide when the apples are the size of peas, and a third, two weeks later. In ordinary seasons three sprayings will be sufficient to hold the disease in check. However, if much rain falls, at least five treatments, two weeks apart, should be made.

The Hop Plant Louse.

(Phorodon Humuli.)

BY PROFESSOR C. V. RILEY.

LIFE HISTORY. Whenever it occurs, whether in England or on the continent of Europe, in New York, Wisconsin or on the Pacific Coast, the Hop Plant-Louse has substantially the same life round. The eggs are laid in the fall on different varieties and

GLASS, TINWARE, GRANITEWARE, CHURNS, ETC.

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species of Plum, both wild and cultivated. They are small, glossy black ovoid, and are attached to the terminal twigs, especially in the more or less protected crevices around the bud. From the eggs there hatches in the spring, about the time when the plum buds begin to burst, a stout female plant-louse, known as the stem-mother, which differs from the summer individuals by having shorter legs and shorter honey tubes. She gives birth, without the intervention of the male, to living young, and this method of propogation continues until the last generation of the season. The second generation grows to full size and gives birth to a third, which becomes winged and developes after the hops have made considerable growth in the yards. The winged lice then fly from the plums to the hops, deserting the plum trees entirely and settling of the leaves of the hops, where they begin giving birth to another generation of wingless individuals.

These multiply with astonishing rapidity* for from five to twelve generations, carrying us in point of time to the hop-picking season. There then developes a generation of winged females which fly back to the plum tree and give birth to the true sexual females, which never acquire wings and never leave the plum tree. By the time this generation has matured, which involves but a few days, varying according to the temperature, belated winged individuals, which are the true males, fly to the hop fields. These fertilize the wingless true females upon the plum leaves and these soon thereafter lay the winter eggs. Thus there is but one generation of sexed individuals produced and this at the close of the life-round—the female wingless on plum trees; the male winged on hops. All intervening generations are composed of virgin female only, (parthenogentic.) This is the invariable round of the insect's life.

From the life history just given, two important facts are obtained: It will pay to make a preventive application of Quassia Emulsion to all plum trees in the neighborhood of hopyards, either (a) in the spring before the appearance of the first winged genera-

*Each female is capable of producing on an average about one hundred young, at the rate of three per day under favorable conditions. Each generation begins about the eighth day after birth, so that the issue from a single individual runs up, in the course of summer, to trillions. The issue from a single stem-mother thus, under favorable conditions, blight hundreds of acres in the course of two or three months.

CHARTER OAK AND GARLAND STOVES IN STOCK.

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tion and its consequent migration to hop, or (b) in the fall after hop picking and after the lice have once more returned to the plum and are making preparation for the laying of winter eggs. The latter time will, perhaps, be preferable, for the reason that in the fall the plum tree will be less succeptible to the action of the washes and a stronger solution can be applied without danger to the trees. All wild plum trees through a hop growing country should be destroyed.

REMEDY.—Spray with emulsion as described on page 11. As soon as you find the fly, "shoot 'em on the wing." By a liberal use of the sprayer a great many flies on their flight from one pole to another, are destroyed as well as the lice on the vines. As long as any signs of either fly or lice can be found keep on spraying. A penny wise pound foolish policy don't pay in raising hops any more than in any other business.

Ready Reference Table For Hop Growers.

The following table of ready references will be found convenient:

From eight to twelve pounds of twine is required to the acre, according to size of twine and distance of hills apart.

Sixty-five pounds of quassia and sixty pounds of whale oil soap is necessary to thoroughly spray an acre four times.

One Roller Sprayer to ten acres: two for thirty acres.

One hand sprayer to every three acres.

One hundred pounds sulphur is necessary to cure a ton of hops.

Fifty yards of cloth and one pound of twine is required to bale a ton of hops.

Poles for string or trellis yards should be 10½ feet long.

A grower should have at least a 24x24 feet hop house for every eight acres of hops averaging 1600 pounds per acre.

The different lengths per pound for cotton twine is estimated: 8-ply, 1000 feet: 10-ply, 800 feet: 12-ply, 750 feet: 16-ply, 650 feet.

We think that 10-ply, all things considered, is the best.

ALL KINDS OF PUMPS, AERMOTOR WINDMILLS.

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Wire Nails.

No.	Inches in Length	Approximate No. to lb.
2	1	1200
3	1¼	720
4	1½	432
6	2	252
8	2½	132
10	3	87
12	3¼	66
16	3½	51
20	4	35
30	4½	27
40	5	21
50	5½	15
60	6	12

Wire.

No	App. Size	Diameter	Ft. to lb.
8	5-32	.162	14.37
9		.148	17.24
10		.135	20.70
11	1-8	.120	26.18
12		.105	34.25
13	3-32	.092	44.68
14		.080	59.17
15		.072	73.00
16	1-6	.063	95.25

No. 10 Galvanized Wire is used for hanging hop pipe.
No. 16 Galv. Wire for berries.
No. 18 for hanging stove pipe.

Rope.

Approx. Weight, Size, and Strength.

Diameter.	No. ft. to lb	Estimated Strength
1-4	38	450 lbs
5-16	27	750 "
3-8	20	900 "
7-16	14	1,200 "
1-2	12	1,700 "
5-8	7 1-2	3,000 "
3-4	6	4,000 "
1	3 1-2	7,000 "
1 1-4	2 1-2	11,000 "
1 1-2	1 1-6	19,000 "
2	11 inches	28,000 "
2 1-2	6 1-4 "	45,000 "
3	4 "	67,000 "

Food For Stock.

The following table shows the number of pounds of various products, used as food for stock, which are equivalent in value to ten pounds of good hay:

FOOD.	POUNDS.
Barley	5 to 6
Cabbage	20 to 30
Carrots, red	25 to 30
Carrots, white	40 to 45
Clover, green	45 to 50
Indian Corn	5 to 7
Mangel wurzel	30 to 35
Oats	4 to 7
Oil Cake	2 to 4
Peas and Beans	3 to 5
Potatoes	20 to 25
Straw, barly	20 to 40
Straw, oats	20 to 40
Straw, wheat	40 to 50
Turnips	45 to 50
Wheat	5 to 6

WE FURNISH PLANS FOR PIPING HOP KILNS.

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Capacity of Cisterns.

To calculate the capacity of cisterns, thirty-one and one-half gallons are estimated to a barrel:

A circular cistern	1	ft. in depth and	5	ft. in diam., holds	4½	barrels
" "	1	" "	6	" "	6¾	"
" "	1	" "	7	" "	9	"
" "	1	" "	8	" "	12	"
A square cistern	1	foot in depth and	5x5	feet, holds....	6	barrels
" "	1	" "	6x6	"	8½	"
" "	1	" "	7x7	"	11½	"
" "	1	" "	8x8	"	15¼	"

Vitality of Seeds.

This table shows the limit of time beyond which the seeds of the common garden vegetables become useless for sowing:

Beans	2 years	Onion	1 years
Beets	7 "	Parsnip	1 "
Cabbage	4 "	Peas	2 "
Carrot	2 "	Radish	3 "
Celery	2 "	Squash	10 "
Cucumber	10 "	Sweet Corn	2 "
Lettuce	3 "	Tomatoes	7 "
Melon	10 "	Turnip	4 "

Bushels of Seed to Acre.

KIND OF SEED	BUSH. TO ACRE	KIND OF SEED	BUSH. TO ACRE
Wheat	1½ to 2	Broom Corn	1 to 1½
Barley	1½ to 2½	Potatoes	5 to 10
Oats	2 to 4	Mustard	8 to 20 quarts
Rye	1 to 2	Herd's Grass	12 to 16 "
Buckwheat	¾ to 1⅛	Timothy	12 to 24 "
Millet	1 to 1½	Red Clover	10 to 16 pnds.
Corn	½ to 1	Flat Turnip	2 to 3 "
Beans	1 to 2	White Clover	3 to 4 "
Peas	2½ to 3½	Blue Grass	10 to 15 "
Hemp	1 to 1½	Orchard Grass	20 to 30 "
Flax	½ to 2	Carrots	4 to 5 "
Rice	2 to 2½	Parsnips	6 to 8 "

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Shingles Required in a Roof.

To the square foot it takes 9, if exposed 4 inches: 8 if exposed 4½ inches.

One thousand shingles, laid 4 inches to the weather, will cover 100 square feet of surface, and 1½ pounds of shingle nails will fasten them on.

How Grain Will Shrink.

Farmers rarely gain by keeping their grain after it is fit for market when the shrinkage is taken into account. Wheat, from the time it is threshed, will shrink two quarts to the bushel, or 6 per cent. in six months, in the most favorable circumstances. Hence, it follows that 94 cents a bushel for wheat when first threshed in August, is as good, taking into account the shrinkage alone, as $1.00 in the following February.

Corn shrinks much more from the time it is first husked. One hundred bushels of ears as they come from the field in November, will be reduced to not far from eighty. So that 40 cents a bushel for corn in the ear as it comes from the field is as good as 50 cents in March, shrinkage only being taken into account.

In the case of potatoes, taking those that rot and are otherwise lost, together with the shrinkage, there is but little doubt that between October and June, the loss to the owner who holds them is not less than 33 per cent.

The estimate is taken on the basis of interest at 7 per cent. and takes no account of loss by vermin.

How To Preserve Eggs.

To each pailful of water add two pints of fresh slacked lime and one pint of common salt; mix well. Fill your barrel half full of this fluid, put your eggs down in it any time after June, and they will keep two years if desired.

Hop Pipe Plans.

We have a large assortment of plans for piping kilns. We shall be pleased to submit specifications and plans free of charge on application.

Write for prices and samples of steel used in hop pipe.

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Testimonials.

The following are a few of the testimonials we have received from hop growers in Washington, Oregon and British Columbia:

PUYALLUP, Wash., Feb. 20, 1894.

During the hop season of 1892 I used one of your Roller Sprayers, with which I sprayed 30 acres of hops eight times with fairly good results. In 1893 you had so materially improved your machine that I laid aside the old one and ordered two new ones, with which I sprayed 38 acres of hops with such good results that at harvest time there were no lousy or mouldy hops in my yard. I am well pleased with the Roller Sprayer, so much so, in fact, that I would not think of raising hops without its aid. I consider it superior to any other Sprayer now manufactured.

Respectfully yours, C. O. BEAN.

PUYALLUP, Wash., Sept. 12, 1892.

We have used the Horse Power Roller Sprayer built by you and find that it gives most excellent satisfaction.

C. H. ROSS & CO.

PUYALLUP, Wash., June 22, 1892.

I have used the Roller Sprayer in my hop yard and am well satisfied with the results. I have sprayed 14 acres with satisfactory results, throwing a clean spray clear over the top of the poles.

R. S. MOORE.

PUYALLUP, Oct. 13, 1893.

Two years' use of the Roller Sprayer convinces me it will do all you claim for it. I sprayed all my hops early, and this I consider the safest and most economical plan. My machine is as good as ever as far as I can see. Yours truly,

J. P. MEEKER.

ALDERTON, Wash., June 21, 1892.

I have given the Roller Sprayer a thorough test, having sprayed 20 acres, and am well satisfied with the work done. I reach the vines at the highest point and find it kills both lice and flies. I am convinced that with your machine I can save my crop.

Respectfully, A. SPOONER.

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BUENA VISTA, Or., March 8, 1894.

I bought one of your Roller Sprayers last season and it gave entire satisfaction. It throws a finer spray with less pressure than any one I have seen or had anything to do with. With a Roller Sprayer in my possession I have no fear whatever of the lice destroying my crops or compelling me to pick too early. I as a hop grower take pleasure in recommending it in preference to all others. Respectfully, WM. WELLS.

ORTING, Wash., July 11, 1892.

Although prejudiced against spraying on the start, I am compelled to say that after using your Sprayer and noticing its satisfactory results I feel confident that hop lice can be successfully combated and at a nominal cost. Very respectfully,

D. O'FARRELL.

NORTH YAMHILL, Or., March 8, 1894.

I bought one of your Roller Sprayers in the spring of 1893. I would say that I am well pleased with the work it did for me. I don't think it can be beat as a sprayer.

Respectfully, etc., MRS. R. E. GALLAGHER.

PUYALLUP, Wash., Jan. 1, 1894.

I wish to state in reference to your Roller Sprayer that I am highly pleased with it, I have had a splendid crop of hops the past season, which, I have no doubt, was owing to the splendid work done by the Sprayer. I have long poles, and think that any grower who wishes to save his crop from the ravages of lice will find an efficient means in the Roller Sprayer.

Respectfully, etc., WM. P. VOSE.

CLAQUATO, Wash., Sept. 28, 1892.

The Roller Sprayer does much better than I thought it would. I think all that one wants is to give the machine a fair show and its work will speak for it at hop picking time.

Respectfully, C. M. GOFF.

NORTH YAMHILL, Or., March 8, 1894.

I would say that your Roller Sprayer is all you claim it to be. I sprayed my own and several of my neighbor's yards and it gave perfect satisfaction. Yours, WM. SHEPARD.

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SHERLOCK, Wash., June 29, 1892.

The Sprayer does excellent work. I can safely recommend it to anybody. Respectfully, ISAAC HAWKS.

PUYALLUP, Wash., Feb. 13, 1894.

Having used your 1893 Roller Sprayer I consider it all that could be desired. I sprayed 60 acres last season and had a fine hop at picking time, free from lice. Respectfully,

G. W. BEACH, Foreman for M. J. Meeker.

PUYALLUP, Wash., Feb. 14, 1894.

I have used your Roller Sprayer for two years. I can recommend it very highly to all hop growers as being the thing they need to save their crops. I sprayed for neighbors the first season enough to pay for the machine. Respectfully,

JAMES M. THOMPSON.

BUTTEVILLE, Or., Feb. 18, 1894.

I am happy to inform you, as a hop grower, that the Roller Sprayer we purchased from you gives perfect satisfaction in all its particulars. I can recommend it to all hop growers.

I am truly yours. FRANCIS MILLER.

NORTH SAANICH, B. C., Feb. 14, 1894.

We are perfectly satisfied with your Puyallup Roller Sprayer; in fact, we would rather pay $150.00 for it than to have any other Sprayer we ever saw for nothing. You cannot use terms too strong in recommending it. We want nothing better.

Yours, etc., J. DOWNEY & SONS.

BUENA VISTA, Or., March 8, 1894.

The Sprayer I bought from you last season gave entire satisfaction. I could not cultivate hops successfully without it, and the expense is small. The Roller Sprayer is a dandy.

Respectfully. JOS. MILLER.

OLEQUA, Wash., Feb. 23, 1894.

I have two of your Roller Sprayers in use. They have both given entire satisfaction. One horse is sufficient to manage each machine with ease. Yours very respectfully,

A. M. PATTERSON.

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PUYALLUP, Wash., July 4, 1892.

I have just finished spraying 32 acres of hops with your Sprayer and consider it far superior to anything on the market. The draft is light: the horse can go over 6 acres a day easily and the spray is everything that could be desired. I have made the hop aphis a study since their appearance in this section, and I can truthfully say that with one of your Roller Sprayers there is no occasion for any of us losing our crop or even a part of it.

Yours very respectfully, JOS. N. FERNANDEZ.

OSCEOLA, Wash., Jan. 29, 1892.

I have one of your Horse-Power Roller Sprayers and have sprayed my nine acres of hops and have done better work than I ever expected I could do. It is light draft, and I can spray from 6 to 7 acres a day and give perfect satisfaction.

Yours respectfully, C. L. SMITH.

TIGARDVILLE, Or., Eeb. 20, 1894.

The Roller Sprayer has no equal. I own one and have sprayed six different yards besides my own yard, and it gave perfect satisfaction. It requires no machinist or expert to work it and it is a durable machine. It takes about one-third less material and only half, or less than half, of the labor required by any other Sprayer. As to the spray on the vine, nothing can be better, as you can gauge it. With a hearty recommendation to all whom it may concern,

Yours respectfully,

W. P. GRAHAM.

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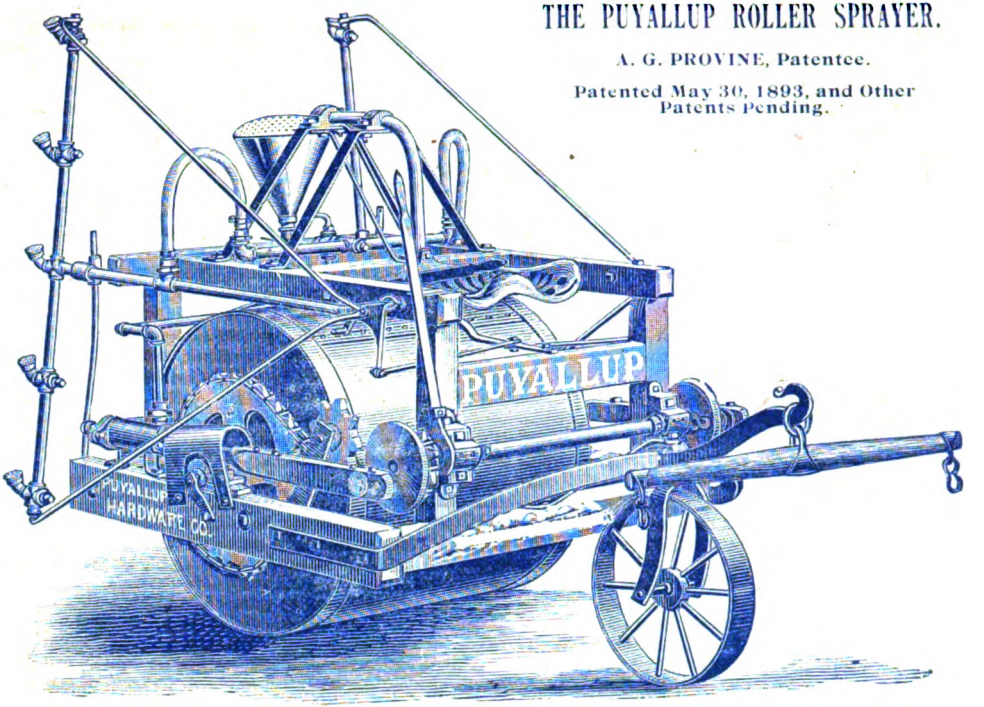
THE PUYALLUP ROLLER SPRAYER.

A. G. PROVINE, Patentee.

Patented May 30, 1893, and Other Patents Pending.



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